

Remarks

The application was reviewed in light of the Office Action mailed July 2, 2004. Claims 1-16 are pending in the application. By the foregoing amendments, claims 1-16 have been amended. No new matter is introduced by the amendments.

The Examiner has objected to the drawings under 37 C.F.R. 1.83(a) because of failure to show every feature of the invention specified in the claims. In particular, this objection states that the embodiment of claim 7 must be shown or the feature canceled from the claim.

Applicants respectfully submit that the current drawings of the application are in the form satisfying the drawing requirements under 37 C.F.R. 1.83(a). 37 C.F.R. 1.83(a) requires the drawings to show every feature of the invention specified in the claims. However, the remaining part of 37 C.F.R. 1.83(a) indicates that there can be exceptions to this rule as it states: "[However,] conventional features disclosed in the description and claims, where their detailed illustration is not essential for a proper understanding of the invention, should be illustrated in the drawing in the form of ..."

Applicants submit that 37 C.F.R. 1.83(a) does not stand alone. As is stated in 37 C.F.R. 1.81(a), also in 35 U.S.C. 113, the standard for requiring a drawing must be "where necessary for the understanding of the subject matter sought to be patented." Claim 7 requires that "the plates of each of the at least one brake disc are received one in every tooth gap of the hub." This claim is very similar to its preceding claim (i.e., claim 6) except that claim 6 requires such plates are received one in every *second* tooth gap of the hub. FIGS. 1-3 of the application show the structural details of this feature required by claim 6. Along with FIGS. 1-3, and also detail description (see paragraph [00021] and [00022]), one ordinary skilled in the art will clearly understand the subject matter of claim 7. Accordingly, it is respectfully submitted that this drawing objection must be withdrawn.

The Examiner has rejected claims 1-16 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Claims 1-16 have been carefully reviewed in light of this rejection and amended by the foregoing amendments. Accordingly, Applicants respectfully submit that claims 1-16 as amended are now in the form satisfying the requirements under 35 U.S.C. 112, second paragraph.

The Examiner has rejected claims 1-3 under 35 U.S.C. 102(b) as being anticipated by WO 98/25804 to Bunker (U.S. Pat. No. 6,223,863).

Claims 1-3 of the invention each require, among other elements, that each of the at least one brake disc include a plurality of plates attached on an inner periphery, in which each of the plates has a length in the axial direction of the hub exceeding the thickness of the corresponding one brake disc.

Bunker (WO 98/25804) discloses a disc brake system including a pair of brake discs 38 and 40 with inwardly-projecting teeth 42, and a hub 14 with leaf springs 44 attached on the outer periphery of the hub 14.

Bunker, however, fails to disclose or teach that each of the at least one brake disc includes a plurality of plates attached on an inner periphery, where each of the plates has a length in the axial direction of the hub exceeding the thickness of the corresponding one brake disc. According to the Office Action, it seems that the Examiner has regarded the leaf springs 44 as being equivalent to plates of the present invention, and maintained that they are furnished on an inner periphery of the disc 38 and 40. However, in Bunker, the leaf springs 44 are not the plates attached on an inner periphery of the brake discs 38 and 40, as required by the claims, but they are rather attached on the outer periphery of the hub 14. Thus, the Bunker brake system utilizes different structural elements, and fails to disclose or teach the subject matter as claimed in claims 1-3.

Moreover, the Bunker brake system functions in a substantially different manner and achieves a different result than the claimed invention. As specifically described in specification of the present invention, the primary purpose of providing a plurality of integrated plates on the inner periphery of the discs is for preventing a self-locking of the discs on the hub caused by the discs becoming skewed when using very thin discs. However, in Bunker, the leaf springs 44 are secured by screws 46 to the outer periphery of the hub 14, and apply resilient radial forces between the hub 14 and the discs 38 and 40 for preventing rattling of the discs and controlling sliding of the discs along the hub. As such, the Bunker system cannot effectively prevent the self-locking effect of the discs. Thus, the Bunker brake system functions in a substantially different manner and achieves a different result.

Accordingly, in view of foregoing, claims 1-3 of the invention are patentably distinct over Bunker.

The Examiner has rejected claims 1-8 under 35 U.S.C. 102(b) as being anticipated by JP 2001-32854 to Mieda (with U.S. equivalent of U.S. Pat. No. 6,419,065).

Mieda (JP 2001-32854) discloses a multi-disc clutch system including a plurality of first friction plates 50, and a plurality of second friction plates 51 movable along a spline hub 69 and for engaging with the first friction plates 50 to provide a clutch operation. Each of the second friction plates 51 is composed of a core plate 90 and a pair of friction members 51a attached on both sides of the core plate 90. For example, see FIGS. 4-7 of Mieda.

Mieda, however, fails to disclose or teach that each of the at least one brake disc includes a plurality of plates attached on an inner periphery, where each of the plates has a length in the axial direction of the hub exceeding the thickness of the corresponding one brake disc, as required by claims 1-8 of the invention.

According to the Office Action, it seems that the Examiner has regarded the second friction plates 51 of Mieda as being equivalent to the brake disc of the present invention. However, the second friction plate 51 does not include a plurality of plates attached on an inner periphery thereof. As details shown in FIG. 5 of Mieda, the core plate 90 of the second friction plate 51 has a generally flat friction mounting portion 91 and tooth portions 92 each with a pair of inclined tooth surfaces 92a and a flat tooth top surface 92b. These tooth portions 92 are not plates which refer to a generally flat member or material as is well established in the art.

Moreover, the tooth portions 92 do not have a thickness (i.e., a length in the axial direction of the hub) which exceeds the thickness of the disc, as required by the claimed invention. As shown in FIG. 7 of Mieda, the thickness "S" of tooth portion 92 is less than the thickness "T" of the second friction plate 51.

Accordingly, in view of foregoing, claims 1-8 of the invention are patentably distinct over Mieda.

According to Mieda, it is stated that the base of the discs is broadened in order to ensure a sufficient torque transmission capacity and strength of the splines coupling. Contrary to this, the base of the discs of the present invention is broadened in order to prevent skewing and self-locking. The problem with skewing and self-locking is associated with spot-type disc brakes, in which the actuator is pressing on the disc in one spot. Mieda concerns a clutch for an automatic transmission which normally is activated by pressure applied over the whole disc surface, which means that problems with skewing and self-locking will not occur. The differences in the aims of the inventions is one reason why the plates of the present invention have a much larger axial length than the tooth portions of the friction plates of Mieda.

Neither Bunker nor Mieda shows brake disc furnished with plates attached on an inner periphery, which plates have an axial length exceeding the thickness of the brake

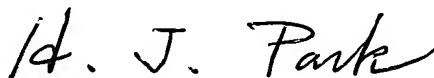
disc. Furthermore, said references do not show any solution to the stated problem solved by the present invention, and function in a substantially different manner.

The Examiner has rejected claim 16 under 35 U.S.C. 103(a) as being unpatentable over JP 2001-32854 to Mieda. Claim 16 is dependent from claim 4, and further requires additional features thereto. Therefore, claim 16 is patentable over Mieda for at least under the reasons that claim 4 is patentable as set forth above.

Applicants gratefully acknowledge the Examiner's indication of allowability of claims 9-15 if rewritten to overcome the rejections under 35 U.S.C. 112, second paragraph, as discussed above, and to include all of the limitations of the base claim and any intervening claims. As discussed above, the application has been amended and now in the form satisfying this requirement under 35 U.S.C. 112, second paragraph. Thus, in view of foregoing discussions regarding patentability of the rejected claims, claims 9-15 as amended are now in condition for allowance.

Accordingly, applicants respectfully submit that all of the claims currently pending in the application (i.e., claims 1-16) are now in condition for allowance. Reconsideration and early notice to that effect is earnestly requested.

Respectfully submitted,



Wesley W. Whitmyer, Jr., Registration No. 33,558
Hyun Jong Park, Limited Recognition
Attorneys for Applicants
ST.ONGE STEWARD JOHNSTON & REENS LLC
986 Bedford Street
Stamford, CT 06905-5619
203 324-6155